



Ref. Certif. No.

JPTUV-045609

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST
CERTIFICATES FOR ELECTRICAL EQUIPMENT
(IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE
CERTIFICATS D'ESSAIS DES EQUIPEMENTS
ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

Product
Produit

Public Address Amplifier

Name and address of the applicant
Nom et adresse du demandeur

Seikaku Technical Group Limited
Offshore Chambers
P. O. Box 217 Apia, Samoa

Name and address of the manufacturer
Nom et adresse du fabricant

Seikaku Technical Group Limited
Offshore Chambers
P. O. Box 217 Apia, Samoa

Name and address of the factory
Nom et adresse de l'usine

Dongguan Jingheng Electron Co., Ltd.
Shenshan Industrial City
Hengli Town, Dongguan, Guangdong 523465, P.R. China

Rating and principal characteristics
Valeurs nominales et caractéristiques principales

Input : AC 220-240V; 50/60Hz, 45W
or DC 12-18V, 3,5A
Class I

Trade mark (if any)
Marque de fabrique (si elle existe)

SHOW

Model/type Ref.
Ref. de type

SA-450ARH, SA-450ARS, SA-450AR, SA-450M, SA-450MEC
SA-450CD, SA-450CDH, SA-450USB

Additional information (if necessary)
Information complémentaire (si nécessaire)

For model differences, refer to the test report.

A sample of the product was tested and found
to be in conformity with
Un échantillon de ce produit a été essayé et a été
considéré conforme à la

IEC 60065:2001+A1+A2
National differences see test report

As shown in the Test Report Ref. No. which forms part
of this Certificate
Comme indiqué dans le Rapport d'essais numéro de
référence qui constitue une partie de ce Certificat

16044920 001

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification



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Date: 29.08.2012

Signature:

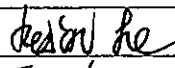
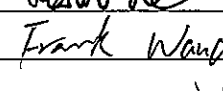
Dipl. Ing. (FH) T. Zimmer



Test Report issued under the responsibility of:



TEST REPORT IEC 60065 Audio, video and similar electronic apparatus - Safety requirements	
Report Number.:	16044920 001
Date of issue.....:	2012-08-28
Total number of pages.....:	52 pages
Applicant's name	Seikaku Technical Group Limited
Address	Offshore Chambers, P. O. Box 217 Apia, Samoa
Test specification: Standard: IEC 60065:2001 (Seventh Edition) + A1:2005 +A2:2010 Test procedure: CB Scheme Non-standard test method: N/A	
Test Report Form No.:	IEC60065K
Test Report Form(s) Originator	Intertek Semko AB
Master TRF	Dated 2010-10
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Test item description.....:	Public Address Amplifier
Trade Mark	SHOW
Manufacturer	Same as applicant
Model/Type reference.....:	SA-450ARH, SA-450ARS, SA-450AR, SA-450M, SA-450MEC, SA-450CD, SA-450CDH, SA-450USB
Ratings	AC220-240V~, 50/60Hz, Power consumption: 45W, DC12-18V, 3,5A

Testing procedure and testing location:		
☒	CB Testing Laboratory:	TÜV Rheinland (Guangdong) Ltd.
Testing location/ address		No.199 Kezhu Road, Guangzhou Science City 510663 Guangzhou, CHINA
☐	Associated CB Laboratory:	N/A
Testing location/ address		N/A
Tested by (name + signature).....		Kevin He 
Approved by (name + signature)		Frank Wang 
☐	Testing procedure: TMP	N/A
Testing location/ address		N/A
Tested by (name + signature).....		
Approved by (name + signature)		
☐	Testing procedure: WMT	N/A
Testing location/ address		N/A
Tested by (name + signature).....		
Witnessed by (name + signature)		
Approved by (name + signature)		
☐	Testing procedure: SMT	N/A
Testing location/ address		N/A
Tested by (name + signature).....		
Approved by (name + signature)		
Supervised by (name + signature).....		
☐	Testing procedure: RMT	N/A
Testing location/ address		N/A
Tested by (name + signature).....		
Approved by (name + signature)		
Supervised by (name + signature).....		

List of Attachments (including a total number of pages in each attachment):

The complete report consists of 52 pages.

Photo documentation of 15 pages.

Summary of testing:

Tests performed (name of test and test clause):

- 5 Durability of Marking Test
- 5.1 Input Current Test
- 7 Heating under Normal Operations
- 8.11 Vibration test
- 9.1.1.1 Determination of hazardous live parts test
- 9.1.1.2 Determination of accessible parts
- 9.1.3 Pin test for opening
- 9.1.4 Pin test for terminals
- 9.1.7 Resistance to external Forces
- 10.1 Surge Test
- 10.2 Humidity Test
- 10.3 Insulation Resistance and electric Strength
- 11.1 Touch current under Fault Conditions
- 11.2 Heating under Fault Conditions
- 12.1.3 Impact Test
- 12.1.4 Drop Test
- 13.2 Determination of operating voltages
- 13.3 Clearance
- 13.4 Creepage distance

Remark:

Models SA-450ARH and SA-450CDH were the selected models for the tests.

Testing location:

TÜV Rheinland (Guangdong) Ltd.

No.199 Kezhu Road, Guangzhou Science City
510663 Guangzhou, CHINA

Summary of compliance with National Differences

EU Group Differences, EU Special National Conditions, EU A-Deviations.

AT, FI, PL, SE

AT=Austria, FI=Finland, PL= Poland, SE=Sweden.

All national differences of EU group were considered according to EN 60065 7th ed. 2002+ A1+A11+A2+A12, Annex ZB and Annex ZC on pages 37-52.

Copy of marking plates

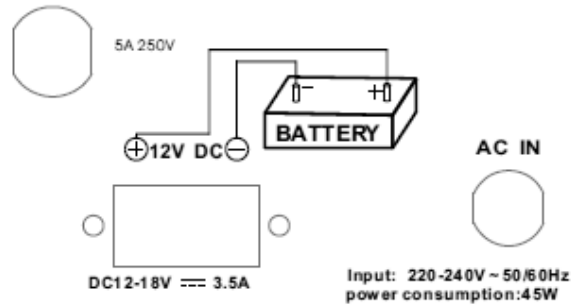
All markings are printed on the outer enclosures of the apparatus.

For model SA-450ARH:



SA-450ARH Public Address Amplifier





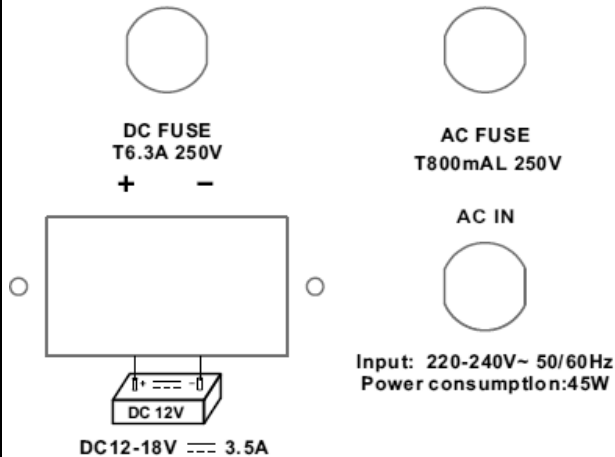
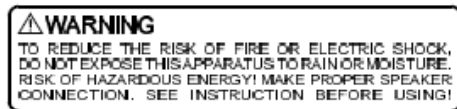
Note:

This is representative label, models SA-450ARS, SA-450AR, SA-450M, SA-450MEC and SA-450USB are identical to it except for model name.

For model SA-450CDH:



SA-450CDH Professional Public Address Amplifier



Note:

This is representative label, model SA-450CD is identical to it except for model name.

Test item particulars						
Classification of installation and use : Portable (Professional use only)						
Supply Connection..... : Non-detachable power cord						
..... :						
Possible test case verdicts:						
- test case does not apply to the test object : N/A (Not Applicable)						
- test object does meet the requirement : P (Pass)						
- test object does not meet the requirement : F (Fail)						
Testing:						
Date of receipt of test item : 2012-08-28						
Date (s) of performance of tests : 2012-08-28						
General remarks:						
The test results presented in this report relate only to the object tested.						
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.						
"(see Enclosure #)" refers to additional information appended to the report.						
"(see appended table)" refers to a table appended to the report.						
Throughout this report a ☒ comma / ☐ point is used as the decimal separator.						
Manufacturer's Declaration per sub-clause 6.2.5 of IEC60065:						
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :						
☐ Yes ☒ Not applicable						
When differences exist; they shall be identified in the General product information section.						
Name and address of factory (ies) : Dongguan Jingheng Electron Co., Ltd. Shenshan Industrial City, Hengli Town, Dongguan, Guangdong 523465, P. R. China						
General product information:						
1. The models SA-450ARH, SA-450ARS, SA-450AR, SA-450M, SA-450MEC, SA-450CD, SA-450CDH, SA-450USB are multiplex professional public address amplifier, which will be supplied by AC or DC source.						
2. Specified maximum ambient temperature is 35°C.						
4. The enclosure is made of metal connected to protective earth.						
Model difference:						
1. SA-450CD and SA-450-CDH with same size and mains transformer.						
2. SA-450ARH, SA-450ARS, SA-450AR, SA-450M, SA-450MEC and SA-450USB with same size and mains transformer.						
3. The difference of function is as below:						
	Basic function 2MIC+1AUX	SIREN	CHIME	CD player	Cassette	MP3
SA-450CD	√	√		√		

SA-450CDH	√	√	√	√		
SA-450ARH	√	√	√		√	
SA-450ARS	√	√			√	
SA-450AR	√				√	
SA-450MEC	√				√	
SA-450M	√					
SA-450USB	√					√

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
3	General requirements		
	Safety class of the apparatus	Class I	P
4	General test conditions		P
4.1.4	Ventilation instructions require the use of the test box	Yes	P
5	Marking and instructions		P
	Comprehensible and easily discernible	All markings are printed on label pasted on outer enclosures of the appliance.	P
	Permanent durability against water and petroleum spirit	After rubbing test by water and petroleum spirit, the markings are still easily discernible, indelible and legible.	P
5.1	a) Identification, maker	Trade mark "SHOW" and model no. are marked on the front panel.	P
	b) Model number or type reference	SA-450ARH, SA-450ARS, SA-450AR, SA-450M, SA-450MEC, SA-450CD, SA-450CDH, SA-450USB	P
	c) Class II symbol if applicable	Class I apparatus	N/A
	d) Nature of supply.....	IEC 60417-5032 symbol used	P
	e) Rated supply voltage	220-240V~ or 12-18V=	P
	f) Mains frequency if safety dependant	50/60Hz for AC source	P
	g) Rated current or power consumption for apparatus supplied by supply apparatus for general use		N/A
	Measured current or power consumption		N/A
	Deviation % (max 10%)		N/A
	h) Rated current or power consumption for apparatus intended for connection to an a.c. mains supply.:	AC source: 45W, DC source: 3,5A.	P
	Measured current or power consumption	(See appended table 7.1)	P
	Measured current or power consumption for Television set	Not Television set.	N/A
	Deviation % (max 10%)	(See appended table 7.1)	P
5.2	a) Earth terminal	Earth symbol applied.	P
	b) Hazardous live terminals	No such terminals provided.	N/A
	c) Markings on supply output terminals	No such terminals provided	N/A
5.3	a) Use of triangle with exclamation mark	The triangle symbols are used on the circuit diagram for the replaceable safety relevant components.	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	b) marking on loudspeaker grille, IEC 60417-5036		N/A
5.4	Instructions for use	English. Instruction in other language shall be provided when national approvals.	P
5.4.1	a) Mains powered equipment not exposed to dripping or splashing. Warning concerning objects filled with liquid, etc.	See user manual.	P
	b) Hazardous live terminals, instructions for wiring	No such terminals provided.	N/A
	c) Instructions for replacing lithium battery	No batteries provided.	N/A
	d) Class I earth connection warning	IEC 60417-5019 symbol used	P
	e) Instructions for multimedia system connection	Not multimedia system.	N/A
	f) Special stability warning for attachment of the apparatus to the floor/wall		N/A
	g) Warning: battery exposure to heat		N/A
	h) Warning: protective film on CRT face	No CRT provided.	N/A
5.4.2	a-b) Disconnect device: plug/coupler or all-pole mains switch location, accessibility and markings	The mains plug was used as disconnect device. See user manual.	P
	c) Instructions for permanently connected equipment	Not permanently connected equipment.	N/A
	Marking, signal lamps or similar for completely disconnection from the mains	The mains plug was used as disconnect device.	N/A
6	Hazardous radiation		P
6.1	Ionizing radiation < 36 pA/kg (0,5 mR/h)	No ionizing radiation inside the EUT.	N/A
	Ionizing radiation under fault condition	See above.	N/A
6.2	Laser radiation, emission limits to IEC 60825-1:2007	Class 1 CD driver used.	P
	Emission limits under fault conditions	See above.	P
7	Heating under normal operating conditions		P
7.1	Temperature rises not exceeding specified values; fuse links and other protective devices defeated	(see appended table)	P
7.1.1	Temperature rise of accessible parts	(see appended table)	P
7.1.2	Temperature rise of parts providing electrical insulation	(see appended table)	P
7.1.3	Temperature rise of parts acting as a support or as a mechanical barrier	(see appended table)	P
7.1.4	Temperature rise of windings	(see appended table)	P
7.1.5	Parts not subject to a limit under 7.1.1 to 7.1.4	(see appended table)	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	Softening temperature of insulating material supporting parts conductively connected to the mains carrying a current > 0,2 A at least 150 °C		N/A
8	Constructional requirements with regard to the protection against electric shock		P
8.1	Conductive parts covered by lacquer, paper, untreated textile oxide films and beads etc. considered to be bare	Enamel coating of winding and the surface material of electrolytic capacitors are not considered as safety isolation.	P
8.2	No shock hazard when changing voltage setting device, fuse-links or handling drawers etc.	Voltage selector is covered by a metal case, which is fixed by screws and not intended to be operated by hand (only for models SA-450CD, SA-450CDH)	P
8.3	Insulation of hazardous live parts not provided by hygroscopic material	No hygroscopic material used.	P
8.4	No risk of electric shock from accessible parts or from parts rendered accessible following the removal of a cover which can be removed by hand	No such cover which can be removed by hand.	N/A
8.5	Class I equipment		P
	Basic insulation between hazardous live parts and earthed accessible parts	The metal panel of appliance is reliably earthed. Basic insulation applied between hazardous live parts and the earthed metal panel.	P
	Resistors bridging basic insulation complying with 14.1 a)		N/A
	Capacitors bridging basic insulation complying with 14.2.1 a)		N/A
	Protective earthing terminal	Protective earthing terminal are fixed reliably.	P
8.6	Class II equipment and Class II constructions within Class I equipment	See below.	P
	Double or reinforced insulation between hazardous live parts and accessible parts	Secondary circuit to primary circuit is separated by reinforced or double insulation. (The insulation system of input transformer is double insulation system).	P
	Components bridging double or reinforced insulation complying with 14.1 a) or 14.3	The input transformer has been tested during this approval.	P
	Basic insulation bridged by components complying with 14.3.4.3.		N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	Basic and supplementary insulation each being bridged by a capacitor complying with 14.1 a)		N/A
	Double or reinforced insulation being bridged with 2 capacitors in series complying with 14.2.1 a)		N/A
	Double or reinforced insulation being bridged with a single capacitor complying with 14.2.1 b)		N/A
8.7	This clause is void		—
8.8	Basic or supplementary insulation > 0,4 mm (mm) :	Bobbin thickness between primary winding and earthed iron core: 0,75mm for input transformer PT-30W and PT-15E-220/230/240V.	P
	Reinforced insulation > 0,4 mm (mm):	Bobbin thickness between primary winding and secondary winding: 1,5mm for input transformer PT-15E-220/230/240V.	P
	Thin sheet insulation (excluding non-separable thin sheet insulation. See 8.22)	See below	P
	Basic or supplementary insulation, at least two layers, each meeting 10.3		N/A
	Basic or supplementary insulation, three layers any two of which meet 10.3		N/A
	Reinforced insulation, two layers each of which meet 10.3	Two layers of insulation tapes are used between primary winding and secondary winding for input transformer PT-30W.	N/A
	Reinforced insulation, three layers any two which meet 10.3		P
8.9	Adequate insulation between internal hazardous live conductors and accessible parts	The internal wires used in the primary circuit, including the lead wire between transformer and power switch, are the approved basic insulation wire with thickness more than 0,4mm, used within an earthed metal enclosure.	P
	Adequate insulation between internal hazardous live parts and conductors connected to accessible parts	See above.	P
8.10	Double insulation between conductors connected to the mains and accessible parts.	See 8.6	P
	Double insulation between internal hazardous live parts and conductors connected to accessible parts.	See above	P
8.11	Detaching of wires	See below.	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	No undue reduction of creepages or clearance distances if wires become detached	Wires adequately protected against detachment by using two independent mechanical fixings.	P
	Vibration test carried out	Vibration test is carried out according to clause 12.1.2	P
8.12	This clause is void		—
8.13	Adequate fastening of windows, lenses, lamp covers etc. (pull test 20 N for 10 s)	No such parts that hazardous live parts are rendered accessible by their absence are used.	P
8.14	Adequate fastening of covers (push/pull test 50 N for 10 s)	Enclosure of the appliance is tested with 50N for 10s, no access to hazardous live parts.	P
8.15	No risk of damage to the insulation of internal wiring due to hot parts or sharp edges	Wires inside the appliance are well secured, no risk of damage to the internal wiring.	P
8.16	Only special supply equipment can be used	Supply from AC mains.	N/A
8.17	Insulated winding wire without additional interleaved insulation	No triple insulated winding wire provided.	N/A
8.18	Endurance test as required by 8.17	Test not required.	N/A
8.19	Disconnection from the mains	Mains plug was used as disconnected device.	P
8.19.1	Disconnect device	See above.	P
	All-pole switch or circuit breaker with >3mm contact separation		N/A
8.19.2	Mains switch ON indication		N/A
8.20	Switch not fitted in the mains cord		N/A
8.21	Bridging components comply with clause 14	No such components provided.	N/A
8.22	Non-separable thin sheet material	No such components provided.	N/A

9	Electric shock hazard under normal operating conditions		P
9.1	Testing on the outside		P
9.1.1	For voltages >1000 V ac or >1500 V dc complies with clause 13.3.1 for basic insulation	No such high voltage.	N/A
9.1.1.1	a) Open circuit voltages	The max. audio signal open circuit voltage: 3,9Vpk for model SA-450ARH; 4,8Vpk for model SA-450CDH.	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	b) Touch current measured from terminal devices using the network in annex D	There are no bridging components except for the linear transformer, which is used between the primary circuit and the secondary circuit.	P
	c) Discharge not exceeding 45 μ C		N/A
	d) Energy of discharge not exceeding 350 mJ		N/A
9.1.1.2	Test with test finger and test probe	No access to hazardous live parts.	P
9.1.2	No hazardous live shafts of knobs, handles or levers	No such hazardous device.	P
9.1.3	Ventilation holes and other holes tested by means of 4 mm x 100 mm test pin	No access to hazardous live parts.	P
9.1.4	Terminal devices tested with 1 mm x 20 mm test pin (10 N); test probe D of IEC 61032	No such terminal	P
	Terminal devices tested with 1 mm x 100 mm straight wire (1 N); test probe D of IEC 61032	See above.	P
9.1.5	Pre-set controls tested with 2.5 mm x 100 mm test pin (10 N); test probe C of IEC 61032	No pre-set controls.	N/A
9.1.6	No shock hazard due to stored charge on withdrawal of the mains plug; voltage (V) after 2 s		N/A
	If C is not greater than 0,1 μ F no test needed		P
9.1.7	Resistance to external forces		P
	a) Test probe 11 of IEC 61032 for 10 s (50 N)		P
	b) Test hook of fig. 4 for 10 s (20 N)		P
	c) 30 mm diameter test tool for 5 s (100 or 250 N)	100N	P
9.2	No hazard after removing a cover by hand	The enclosure of the appliance is fixed by screws, no risk of removing by hand.	N/A

10	Insulation requirements		P
10.1	Insulation resistance (M Ω) at least 2 M Ω min. after surge test for basic and 4 M Ω min. for reinforced insulation	Class I equipment	N/A
10.2	Humidity treatment 48 h or 120 h	Performed for 48 h at temperature 30°C and a relative humidity 95%.	P
10.3	Insulation resistance and dielectric strength between mains terminals	(see appended table)	P
	Insulation Resistance and dielectric strength across BASIC or SUPPLEMENTARY insulation (Class I)	Primary circuit to metal enclosure which connect to PE	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	Insulation resistance and dielectric strength across REINFORCED insulation (Class II)	(see appended table)	P
11	Fault conditions		P
11.1	No shock hazard under fault condition	No electric shock during fault operation. For details refer to appended table 11.2.	P
11.2	Heating under fault condition	See below.	P
	Flames extinguish within 10 seconds	No such flames	P
	No hazard from softening solder	No solder point became soft.	P
	Soldered terminations not used as protective mechanism		P
11.2.1	Measurement of temperature rises	(see appended table)	P
11.2.2	Temperature rise of accessible parts	(see appended table)	P
11.2.3	Temperature rise of parts, other than windings and printed boards, providing electrical insulation	(see appended table)	P
11.2.4	Temperature rise of parts acting as a support or mechanical barrier	(see appended table)	P
11.2.5	Temperature rise of windings	(see appended table)	P
11.2.6	Temperature rise of printed boards shall not exceed the limits of table 3 by max. 100 K for max. 5 min	No points on the PCB exceed the limit.	N/A
	Printed circuit boards (PCB) classified as V-0 according to 60695-11-10 or Clause G.1 may exceed the limit in table 3 in case a) and b):		N/A
	a) Temperature rise of printed circuit boards exceeding the limits of table 3 by not more than 100 K for an area not greater than 2 cm ²		N/A
	b) Temperature rise of printed circuit boards exceeding the limits of table 3 up to 300 K for an area not greater than 2 cm ² for a maximum of 5 min		N/A
	Meets all the special conditions if conductors on printed circuit boards are interrupted		N/A
	Class I protective earthing maintained		P
11.2.7	Temperature rise of parts not subject to the limits of 11.2.1 to 11.2.6 shall not exceed the limits in table 3, item e), "Fault conditions".		N/A
12	Mechanical strength		P
12.1.1	Bump test where mass >7 kg	Weight: max. 5,6kg (SA-450CDH)	N/A
12.1.2	Vibration test	No damage.	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
12.1.3	Impact hammer test	After test, dielectric strength test of clause 10.3 is performed. Result: no damage in the sense of the standard.	P
	Steel ball test	2J	P
12.1.4	Drop test for portable apparatus where mass ≤ 7 kg	Weight: max. 5,6kg (SA-450CDH)	P
12.1.5	Thermoplastic enclosures stress relief test	Only metal enclosure used.	N/A
12.2	Fixing of knobs, push buttons, keys and levers		P
12.3	Remote controls with hazardous live parts	No remote controls provided.	N/A
12.4	Drawers (pull test 50 N, 10 s)	No drawers provided.	N/A
12.5	Antenna coaxial sockets providing isolation	No antenna coaxial sockets provided.	N/A
12.6	Telescoping or rod antennas construction	Not such a construction.	N/A
12.6.1	Telescoping or rod antennas securement		N/A

13	Clearances and creepage distances		P
13.1	Clearances in accordance with 13.3	Clearance measured according to annex E. Pollution degree 2 was considered.	P
	Creepage distances in accordance with 13.4	Creepage distances measured according to annex E. Pollution degree 2 was considered.	P
13.2	Determination of working voltage	For obtaining the operating voltages the EUT was connected to a 240 V TN power system. The highest operating voltages are measured as follows: 250Vrms, 420Vpk (linear transformer).	P
13.3	Clearances		P
13.3.1	General		P
13.3.2	Circuits conductively connected to the mains comply with table 8 and, where applicable, table 9.....:	(see appended table)	P
13.3.3	Circuits not conductively connected to the mains comply with table 10		N/A
13.3.4	Measurement of transient voltages		N/A
13.4	Creepage distances	(see appended table)	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	Creepage distances greater than table 11 minimum values		P
13.5	Printed boards		N/A
13.5.1	Clearances and creepage distances between conductors on printed circuit boards, one of which may be conductively connected to the mains, as in fig. 10		N/A
13.5.2	Type B coated printed circuit boards complying with IEC 60664-3 (basic insulation only)		N/A
13.6	Conductive parts along uncemented joints clearances and creepage distances comply with 13.3 and 13.4	No such parts provided.	N/A
	Conductive parts along reliably cemented joints comply with 8.8		N/A
	Temperature cycle test and dielectric strength test		N/A
	500V test for transformers, magnetic coupler and similar devices, if insulation is relied upon for safety	Not such a construction.	N/A
13.7	Enclosed, enveloped or hermetically sealed parts not conductively connected to the mains, clearances and creepage distances as in table 12		N/A
13.8	Parts filled with insulating compound, meeting the requirements of 8.8	No such parts provided.	N/A

14	Components		P
14.1	Resistors		N/A
	a) Resistors between hazardous live parts and accessible metal parts	No such resistors provided.	N/A
	b) Resistors, other than between hazardous live parts and accessible parts		N/A
	Resistors separately approved		N/A
14.2	Capacitors and RC units		P
	Capacitors separately approved :		N/A
14.2.1	Y capacitors tested to IEC 60384-14:2005	No such capacitors provided.	N/A
14.2.2	X capacitors tested to IEC 60384-14:2005	No such capacitors provided.	N/A
14.2.3	Capacitors operating at mains frequency but not connected to the mains: tests for X2	No such capacitors provided.	N/A
14.2.5	Capacitors with volume exceeding 1750 mm ³ , where short-circuit current exceeds 0,2 A: compliance with IEC 60384-1, 4.38 category B or better	Volume of other capacitors not exceed 1750mm ³	N/A
	Capacitors with volume exceeding 1750 mm ³ , mounted closer to a potential ignition source than table 5 permits: compliance with IEC 60384-1, 4.38 category B or better		N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	Shielded by a barrier acc. to 20.1.4/ table 21 or metal	Electrolytic capacitors provided with metal can.	P
14.3	Inductors and windings		P
	Comply with IEC 61558-1, IEC 61558-2 (as relevant) and clause 20.1.4		N/A
14.3.1	Transformers and inductors marked with manufacturer's name and type	The input transformer is marked with type and manufacturer information (as code), provided as label on surface.	P
	Transformers and inductors separately approved .:	Tested with appliance.	N/A
14.3.2	General		P
	Insulation material complies with clause 20.1.4		P
14.3.3	Constructional requirements		P
14.3.3.1	Clearances and creepage distances comply with clause 13	(see appended table 13.3 and 13.4)	P
14.3.3.2	Transformers meet the constructional requirements		P
14.3.4	Separation between windings		P
14.3.4.1	Class II transformers have adequate separation between hazardous live parts and accessible parts (double or reinforced insulation)	Reinforced or double insulation between primary windings/parts and secondary windings/parts. Details see appended table 13.3 and 13.4.	P
	Coil formers and partition walls > 0,4 mm	Bobbin thickness between primary winding and secondary winding: 1,5mm	N/A
14.3.4.2	Class I transformers, with basic insulation and protective screening only if all 7 conditions of 14.3.4.2 are met	Not a Class I transformer design.	N/A
14.3.4.3	Separating transformers with at least basic insulation	Not such a transformer design.	N/A
14.3.5	Insulation between HAZARDOUS LIVE parts and ACCESSIBLE parts		P
14.3.5.1	Class II transformers have adequate insulation between hazardous live parts and accessible parts (double or reinforced insulation)	See subclause 14.3.4.1 above.	P
	Coil formers and partition walls > 0,4 mm		N/A
14.3.5.2	Class I transformers have adequate insulation between hazardous live parts and accessible conductive parts or those conductive parts or protective screens connected to a protective earth terminal	Not a Class I transformer design.	N/A
	Winding wires connected to protective earth have adequate current-carrying capacity		N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
14.4	High voltage components	No component operating at voltages exceeding 4 kV.	N/A
	High-voltage components and assemblies: U > 4 kV (peak) separately approved		N/A
	Component meets category V-1 of IEC 60707		N/A
14.4.1	High voltage transformers and multipliers tested as part of the submission		N/A
14.4.2	High voltage assemblies and other parts tested as part of the submission		N/A
14.5	Protective devices		P
	Protective devices used within their ratings	See below.	P
	External clearances and creepage distances meet requirement of clause 13 for the voltage across the device when opened	See subclause 14.5.2.1.	P
14.5.1.1	a) Thermal cut-outs separately approved	(See appended table)	P
	b) Thermal cut-outs tested as part of the submission		N/A
14.5.1.2	a) Thermal links separately approved	No such components provided.	N/A
	b) Thermal links tested as part of the submission		N/A
14.5.1.3	Thermal devices re-settable by soldering	No such components provided.	N/A
14.5.2.1	Fuse-links in the mains circuit according to IEC 60127	Fuse link sources comply with IEC 60127-3. For source details refer to appended table 14.	P
14.5.2.2	Correct marking of fuse-links adjacent to holder ...:	AC fuse marked on rear panel closed fuse holder: Fuse: T800mA 250V (SA-450CD, SA-450CDH) DC Fuse located closed fuse holder: DC FUSE: T6,3A 250V (SA-450CD, SA-450CDH), 5A 250V (other models).	P
14.5.2.3	Not possible to connect fuses in parallel	Fuse holder is used.	P
14.5.2.4	Not possible to touch hazardous live parts when replacing fuse-links without the use of a tool		P
14.5.3	PTC thermistors comply with IEC 60730-1:2007	No such components provided.	N/A
	PTC devices (15 W) category V-1 or better		N/A
14.5.4	Circuit protectors have adequate breaking capacity and their position is correctly marked	No such components provided.	P
14.6	Switches	(see appended table)	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
14.6.1 a)	Separate testing to IEC 61058-1 including: - 10 000 operations - Normal pollution suitability - Make and break speed independent of speed of actuation V-0 compliance with annex G, G.1.1	VDE approved. 10000 operating cycles; normal pollution situation, level 3; and flammability material of plastic material V-0, UL approved. (see appended table)	P
14.6.1 b)	Tested in the apparatus:	Approved switch used.	N/A
	Switch controlling > 0.2A with open contact voltage > 35 V (peak)/24 V dc complying with 14.6.3, 14.6.4 and V-0 in annex G, G.1.1		N/A
	Switch controlling > 0.2A with open contact voltage < 35 V (peak)/24 V dc complying with 14.6.3 and V-0 in annex G, G.1.1		N/A
	Switch controlling < 0.2A with open contact voltage > 35 V (peak)/24 V dc complying with 14.6.4 and V-0 in annex G, G.1.1		N/A
14.6.2	Switch tested to 14.6.1 b) constructed to IEC 61058-1 subclause 13.1 and has making/breaking action independent of speed of actuation		N/A
14.6.3	Switch tested to 14.6.1 b) compliant with IEC 61058-1 subclause 16.2.2 d) and m) not attaining excessive temperatures in use		N/A
14.6.4	Switch tested to 14.6.1 b) has adequate dielectric strength		N/A
14.6.5	Mains switch controlling mains socket outlets additional tests to IEC 61058-1		N/A
	Socket outlet current marking correct		N/A
14.7	Safety interlocks		N/A
	Safety interlocks to 2.8 of IEC 60950-1	No safety interlocks provided.	N/A
14.8	Voltage setting devices and the like	VDE approved (only for SA450CD, SA-450CDH).	P
	Voltage setting device not likely to be changed accidentally	The device lie on the bottom enclosure and it cannot be changed accidentally.	P
14.9	Motors		P
14.9.1	Endurance test on motors	DC-motor used in secondary circuit.	N/A
	Motor start test		N/A
	Dielectric strength test		N/A
14.9.2	Not adversely affected by oil or grease etc.		P
14.9.3	Protection against moving parts		P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
14.9.4	Motors with phase-shifting capacitors, three-phase motors and series motors meet clause. B.8, B.9 and B.10 of IEC 60950-1, Annex B		N/A
14.10	Batteries		N/A
14.10.1	Batteries mounted with no risk of accumulation of flammable gases	No batteries provided.	N/A
14.10.2	No possibility of recharging non-rechargeable batteries		N/A
14.10.3	Recharging currents and times within manufacturers limits		N/A
	Lithium batteries discharge and reverse currents within the manufacturers limits		N/A
14.10.4	Battery mould stress relief		N/A
14.10.5	Battery drop test		N/A
14.11	Optocouplers	No opto-coupler used.	N/A
	a) Comply with 13.6 (jointed insulation) and N.2.1		N/A
	b) Comply with IEC 60747-5-5:2007	(See append table)	N/A
	Alternative to a) and b) optocoupler comply with 13.8		N/A
	a) Comply with 13.6 (jointed insulation) and N.2.1		N/A
14.12	Surge suppression varistors	No such component used.	N/A
	Comply with IEC 61051-2		N/A
	Not connected between mains and accessible parts except for earthed parts of permanently connected apparatus		N/A
	Complies with the current pulse, fire hazard and thermal stress requirements of 14.12		N/A

15	Terminals		P
15.1.1	Mains plug, appliance inlet, interconnection couplers and mains socket-outlet meet the appropriate standard	Approved non-detachable power cord with plug provided. Details see table 14.	P
	Overloading of plugs or appliance inlets prevented if the apparatus has mains socket outlets	No mains socket outlets	N/A
	Overloading of internal wiring prevented if the apparatus has mains socket outlets	No mains socket outlets	N/A
15.1.2	Connectors for antenna, earth, audio, video or data		P
	No risk of insertion in mains socket-outlets	No such connectors.	N/A
	No risk of insertion into audio- or video- outlets marked with the symbol of 5.2	Mis-mating of connectors is prevented by its incompatible form or location.	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
15.1.3	Output terminals of a.c. adaptors or similar devices not compatible with household mains socket-outlets	No such output terminal	N/A
15.2	Provision for protective earthing		P
	Accessible conductive parts of Class I equipment reliably connected to earth terminal, within equipment	Metal enclosure of the appliance is reliably connected to the protective earth.	P
	Protective earth conductors correctly coloured	Green / Yellow wire used.	P
	Equipment with non-detachable mains cord provided with separate protective earth terminal near mains input		N/A
	Protective earth terminal resistant to corrosion		P
	Earth resistance test: $< 0,1 \Omega$ at 25 A	0,06 Ω	P
15.3	Terminals for external flexible cords and for permanent connection to the mains supply		P
15.3.1	Adequate terminals for connection of permanent wiring	Not permanent connection	N/A
15.3.2	Reliable connection of non-detachable cords		P
	Not soldered to conductors of a printed circuit board	Double fixing methods used, not possible to become detached.	P
	Adequate clearances and creepage distances between connections should a wire break away		P
	Wire secured by additional means to the conductor	Wire anchorage used.	P
15.3.3	Screws and nuts clamping conductors have adequate threads: ISO 261, ISO 262 or similar	No such fixing.	N/A
15.3.4	Soldered conductors wrapped around terminal prior to soldering or held in place by additional means	Double fixing methods used.	N/A
	Clamping of conductor and insulation if not soldered or held by screws		N/A
15.3.5	Terminals allow connection of appropriate cross-sectional area of conductors, for the rated current of the equipment	The max. rated current: 0,2A, and 0,75mm ² power cord used.	P
15.3.6	Terminals to 15.3.3 have sizes required by table 16		N/A
15.3.7	Terminals clamp conductors between metal and have adequate pressure	No such terminals.	N/A
	Terminals designed to avoid conductor slipping out when tightened or loosened		N/A
	Terminals adequately fixed to avoid loosening when the clamping is tightened or loosened and stress on internal wiring is avoided		N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
15.3.8	Terminals carrying a current more than 0,2 A: contact pressure not transmitted by insulating material except ceramic		N/A
15.3.9	Termination of non-detachable cords: wires terminated near to each other	The equipment was provided with non-detachable cords.	P
	Terminals located and shielded: test with 8 mm strand		P
15.4	Devices forming a part of the mains plug		N/A
15.4.1	No undue strain on mains socket-outlets	The appliance is not direct plug-in device.	N/A
15.4.2	Device complies with standard for dimensions of mains plugs		N/A
15.4.3	Device has adequate mechanical strength (tests a,b,c)		N/A
16	External flexible cords		P
16.1	Mains cords sheathed type, complying with IEC 60227 for PVC or IEC 60245 for synthetic rubber cords	(See appended table)	P
	Non-detachable cords for Class I have green/yellow core for protective earth		P
16.2	Mains cords conductors have adequate cross-sectional area for rated current consumption of the equipment	Normal cross section is 0,75mm ² ; the rated current was max. 0,2A.	P
16.3	a) Flexible cords not complying with 16.1, used for interconnections between separate units of equipment used in combination and carrying hazardous live voltages, have adequate dielectric strength		N/A
	b) Flexible cords not complying with 16.1, withstand bending and mechanical stress (3.2 of IEC 60227-2)		N/A
16.4	Flexible cords used for connection between equipment have adequate cross-sectional areas to avoid temperature rise under normal and fault conditions		N/A
16.5	Adequate strain relief on external flexible cords	Cord anchorage used on external flexible cord. It provided adequate strain relief.	P
	Not possible to push cord back into equipment	Displaced by 1,0mm.	P
	Strain relief device unlikely to damage flexible cord		P
	For mains cords of Class I equipment, hazardous live conductors become taut before earth conductor		P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
16.6	Apertures for external flexible cord: no risk of damage to the cord during assembly or movement in use		P
16.7	Transportable musical instruments and amplifiers fitted with detachable cord set with appliance inlet to IEC 60320-1	Non-detachable power cord used.	N/A
	Transportable musical instruments and amplifiers fitted with detachable cord sets or with means of stowage to protect the cord		N/A

17	Electrical connections and mechanical fixings		P
17.1	Torque test to table 20		P
	- screws into metal: 5 times	Screws installed on the back metal enclosure of the appliance are $\Phi 4\text{mm}$. Tested with 1,2Nm for 5 times.	P
	- screws into non-metallic material: 10 times		N/A
17.2	Correct introduction into female threads in non-metallic material		N/A
17.3	Cover fixing screws: captive	No captive screws used.	N/A
	Non-captive fixing screws: no hazard when replaced by a screw whose length is 10 times its diameter	The Cl. & Cr. distance are not less than the requirement after replacement by a screw whose length is 10 times its diameter.	P
17.4	No loosening of conductive parts carrying a current $> 0,2\text{ A}$	All conductive parts are well secured.	P
17.5	Contact pressure not transmitted through plastic other than ceramic for connections carrying a current $> 0,2\text{ A}$		P
17.6	Stranded conductors of flexible supply cords carrying a current $> 0,2\text{ A}$ with screw terminals not consolidated by solder		N/A
17.7	Cover fixing devices other than screws have adequate strength and their positioning is unambiguous	Screw was used for fixing enclosure.	N/A
17.8	Fixing devices for detachable legs or stands provided		N/A
17.9	Internal pluggable connections, affecting safety, unlikely to become disconnected	Tested with 2N force, no disconnection occurred.	P

18	Mechanical strength of picture tubes and protection against the effects of implosion		N/A
18.1	Picture tube separately approved to IEC 61965:	No picture tube.	N/A
	Picture tube separately approved to 18.2:		N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
18.2	Non-intrinsically protected tubes tested to 18.2		N/A

19	Stability and mechanical hazards		P
	Mass of the equipment exceeding 7 kg	Weight: max. 5,6kg.	N/A
	Apparatus intended to be fastened in place – suitable instructions	The apparatus is not intended to be fastened in place.	N/A
19.1	Test on a plane, inclined at 10° to the horizontal		N/A
19.2	100 N force applied vertically downwards		N/A
19.3	100 N force, or 13% of weight, applied horizontally to point of least stability		N/A
19.4	Edges or corners not hazardous	Edges or corners are smooth and rounded.	P
19.5	Glass surfaces (exc.laminated) with an area exceeding 0,1 m ² or maximum dimension > 450 mm, pass the test of 19.5.1	No glass surface used.	N/A
19.6	Wall or ceiling mountings adequate		N/A

20	Resistance to fire		P
20.1	Electrical components and mechanical parts		P
	a) Exemption for components contained in an enclosure of material V-0 to IEC 60695-11-10 with openings not exceeding 1 mm in width		N/A
	b) Exemption for small components as defined in 20.1	Small components mounted on a PCB with rating as described in table 14. Furthermore, refer to sub-clause 20.1.4.	P
20.1.1	Electrical components meet the requirements of Clause 14 or 20.1.4	See subclauses 14 and 20.1.4.	P
20.1.2	Insulation of internal wiring working at voltages > 4 kV or leaving an internal fire enclosure, or located within the areas mentioned in Table 21, not contributing to the spread of fire	Internal wiring working at voltages not exceeding 4 kV.	N/A
20.1.3	Material of printed circuit boards on which the available power exceeds 15 W at a voltage between 50 V and 400 V (peak) a.c. or d.c. meets V-1 or better to IEC 60707, unless used in a fire enclosure	Flammability of PCB: V-0 or better.	P
	Material of printed circuit boards on which the available power exceeds 15 W at a voltage >400 V (peak) a.c. or d.c. meets V-0 to IEC 60707	Flammability of PCB: V-0.	P

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
20.1.4	Components and parts not covered by 20.1.1, 20.1.2 and 20.1.3 (other than fire enclosures) mounted nearer to a potential ignition source than the distances in Table 21 comply with the relevant flammability category in Table 21	(See table 14)	P
	Components and parts as above but shielded from a potential ignition source, with the barrier area in accordance with Table 21 and fig. 13	The enclosure of the appliance is made of metal.	P
	Apparatus with voltages >4kV under normal operating conditions and distances to the enclosure exceed those specified Table 21, flammability classification HB40 or better is required for the enclosure		N/A
20.2	Fire enclosure		N/A
20.2.1	Potential ignition sources with open circuit voltage > 4 kV (peak) a.c. or d.c. contained in a fire enclosure to V-1	No such high voltage. The enclosure of the appliance is made of metal.	N/A
20.2.2	Internal fire enclosures with openings not exceeding 1 mm in width and with openings for wires completely filled		N/A
20.2.3	Requirements of 20.2.1 and 20.2.2 met by an internal fire enclosure		N/A

A	Annex A, Additional requirements for apparatus with protection against splashing water		N/A
A.5	Marking and instructions	IPX0	N/A
A.5.1	j) Marked with IPX4 (IEC 60529), 5.4.1 a) does not apply		N/A
A.10	Insulation requirements		N/A
A.10.2	Splash and humidity treatment		N/A
A.10.2.1	Enclosure provides protection against splashing water		N/A
A.10.2.2	Humidity treatment carried out for 7 days		N/A

B	Annex B, Apparatus to be connected to the TELECOMMUNICATION NETWORKS		N/A
	Complies with IEC 62151 clause 1	No TNV.	N/A
	Complies with IEC 62151 clause 2		N/A
	Complies with IEC 62151 clause 3 but with 3.5.4 modified to 2.4.10 of this standard		N/A
	Complies with IEC 62151 clause 4 but with 4.1.2, 4.1.3 and 4.2.1.2 modified in accordance with annex B of this standard		N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	Complies with IEC 62151 cause 5 but with 5.3.1 modified in accordance with annex B of this standard		N/A
	Complies with IEC 62151 clause 6		N/A
	Complies with IEC 62151 clause 7		N/A
	Complies with IEC 62151 annex A, B and C		N/A
L	ANNEX L, Additional requirements for electronic flash apparatus for photographic purposes		N/A
L. 5	Marking and instructions		N/A
L. 5.4	Instructions for battery chargers and Supply apparatus indicating type or model number of flash apparatus with which it is to be used	No such equipment.	N/A
	Instructions for flash apparatus indicating type or model number of battery chargers or Supply apparatus with which it is to be used		N/A
L. 7	Heating under normal operating conditions		N/A
L7.1.5 & L11.2.7	Lithium batteries meet permissible temp rise in Table 3, unless comply with 6.2.2.1 or 6.2.2.2 of IEC 60086-4		N/A
L. 9	Electric shock hazard under normal operating conditions		N/A
L. 9.1.1	Terminals to connection to synchroniser not HAZARDOUS LIVE		N/A
L.10	Insulation requirements		N/A
L. 10.3.2	High frequency puls ignition		N/A
L. 12	Mechanical strength		N/A
L. 12.1.3	Windows for flash tubes are excluded from steel ball impact test		N/A
L. 14	Components		N/A
L14.6.6	Mains switch characteristics appropriate to its function under normal conditions		N/A
L. 20	Resistance to fire		N/A
L. 20.1 c)	Trigger coil for discharge purpose is not considered to be a POTENTIAL IGNITION SOURCE		N/A

7.1	TABLE: temperature rise measurements:						P
	Power consumption in the OFF/Stand-by mode of the functional switch (W)				0W/ --		
Model: SA-450ARH							
Cond.	Un (V)	Hz	In (A)	Pn (W)	Uout (V)	Pout (W)	Operating Condition / Status
1	AC264,0	50	0,10	23,0	3,0	2,3	Mic input 14,5mV pink noise, the volume is adjusted to a suitable position. Load: 4Ω. 1/8 non-clipped output power. Test time: 3 hrs.
2	AC240,0	50	0,08	18,0	2,6	1,7	
3	AC220,0	50	0,07	16,0	2,5	1,6	
4	AC198,0	50	0,06	14,0	2,3	1,4	
5	DC19,8V	--	0,6	11,0	1,8	1,2	
6	DC18,0V	--	0,7	13,3	2,5	1,6	
	Loudspeaker impedance (Ω)				Low: 4Ω		—
	Several loudspeaker systems.....				1		—
	Marking of loudspeaker terminals.....				+/-		—
Temperature Rise dT of Part				dT (K)			Limit max dT (K)
Test Condition No.				1	5	--	
Primary winding of input transformer				33,7	6,2	55	
Secondary winding of input transformer				32,5	6,4	55	
Iron core of input transformer				31,0	7,0	55	
Primary lead wire				14,8	6,0	70	
Capacitor C31				33,0	11,8	50	
PCB under D2				56,5	10,8	95	
PCB under U1				37,8	29,3	95	
Power switch				5,9	3,6	50	
MIC surface				5,6	2,8	40	
Outside enclosure (top, near transformer)				12,0	4,9	40	
Outside enclosure (front panel)				8,4	3,5	40	
Outside enclosure (bottom)				15,7	6,2	40	
Outside enclosure (rear panel, near heat sink)				33,6	16,7	40	
Winding temperature rise measurements							
Ambient temperature t1 (°C)				24,6	17,0	—	
Ambient temperature t2 (°C)				24,6	17,8	—	
Temperature rise dT of winding: $dT = \frac{(R_2 - R_1)}{R_1} \times (234.5 + t_1) - (t_2 - t_1)$				R ₁ (Ω)	R ₂ (Ω)	dT (K)	Limit max (K)
							Insulation class

Primary winding of the input transformer (AC264,0V, 50Hz)	64,9	76,3	45,6	65	Class A
Secondary winding of the input transformer (AC264,0V, 50Hz)	0,27	0,32	43,2	65	Class A

NOTE:

According to the user manual, the appliance is intended to be used in moderate climate, so the basic ambient temperature is 35°C, The max. temperature rise is calculated as follows:

▪ Winding components:

- Class A → dT_{max} = 65K -10K =55K(10°C decreased by thermal coupler method)
- Class A → dT_{max} = 65K (thermal resistor method)

▪ Components with T-marking:

Electrolytic capacitor(C31) with T-marking of 85°C: →dT_{max}=(85-35)K=50K

PCB with T- marking of 130°C: →dT_{max}=(130-35)K=95K

Lead wire with T- marking of 85°C: →dT_{max}=(85-35)K=50K

Power switch with T- marking of 85°C: →dT_{max}=(85-35)K=50K

Other:

Metal enclosure outside: →dT_{max}=(85-35)K=40K

7.1	TABLE: temperature rise measurements:		P
	Power consumption in the OFF/Stand-by mode of the functional switch (W)	0W/ --	

Model: SA-450CDH

Cond.	Un (V)	Hz	In (A)	Pn (W)	Uout (V)	Pout (W)	Operating Condition / Status
1	AC264,0	50	0,25	49,3	3,0	4,5	Mic input 14,5mV pink noise, the volume is adjusted to a suitable position. Load: 2Ω. 1/8 non-clipped output power. Test time: 3 hrs.
2	AC240,0	50	0,24	42,5	2,6	4,3	
3	AC220,0	50	0,22	35,6	2,5	3,4	
4	AC198,0	50	0,21	30,8	2,3	3,2	
5	DC19,8V	--	1,2	21,4	1,8	1,6	
6	DC18V	--	1,2	22,6	2,5	2,6	

	Loudspeaker impedance (Ω)	Low: 2Ω	—
	Several loudspeaker systems.....	1	—
	Marking of loudspeaker terminals.....	+/-	—

Temperature Rise dT of Part	dT (K)		Limit max dT (K)
Test Condition No.	1	5	--
Primary winding of input transformer	41,2	10,8	55
Secondary winding of input transformer	40,9	11,4	55
Iron core of input transformer	34,0	11,4	55
Primary lead wire	18,6	11,0	70

Capacitor C102	26,6	23,8	50
PCB under D101	52,6	22,2	95
PCB under IC101	70,7	52,7	95
PCB under Q101	54,1	46,1	95
Power switch	5,4	43,8	50
MIC surface	3,5	6,3	40
Outside enclosure (top, near transformer)	29,0	5,1	40
Outside enclosure (front panel)	7,4	15,9	40
Outside enclosure (bottom)	19,4	9,9	40
Winding temperature rise measurements			
Ambient temperature t1 (°C)	24,0	17,5	—
Ambient temperature t2 (°C)	24,5	19,8	—
Temperature rise dT of winding: $dT = \frac{(R_2 - R_1)}{R_1} \times (234.5 + t_1) - (t_2 - t_1)$	R ₁ (Ω)	R ₂ (Ω)	dT (K)
Primary winding of the input transformer (AC264,0V, 50Hz)	13,5	16,2	51,2
Secondary winding of the input transformer (AC264,0V, 50Hz)	0,14	0,17	49,4
			Limit max (K)
			Insulation class
			Class A
			Class A

NOTE:

According to the user manual, the appliance is intended to be used in moderate climate, so the basic ambient temperature is 35°C. The max. temperature rise is calculated as follows:

▪ Winding components:

- Class A → dT_{max} = 65K - 10K = 55K (10°C decreased by thermal coupler method)
- Class A → dT_{max} = 65K (thermal resistor method)

▪ Components with T-marking:

Electrolytic capacitor (C31) with T-marking of 85°C: → dT_{max} = (85-35)K = 50K

PCB with T-marking of 130°C: → dT_{max} = (130-35)K = 95K

Primary lead wire with T-marking of 105°C: → dT_{max} = (105-35)K = 70K

Power switch with T-marking of 85°C: → dT_{max} = (85-35)K = 50K

Other:

Metal enclosure outside: → dT_{max} = (85-35)K = 40K

7.2	TABLE: softening temperature of thermoplastics			N/A
Temperature T of part		T - normal conditions (°C)	T - fault conditions (°C)	Min T softening (°C)
Note: --				

10.3	TABLE: insulation resistance measurements			P
Insulation resistance R between:		R (MΩ)	Required R (MΩ)	

Insulation resistance R between:	R (MΩ)	Required R (MΩ)
Unit		
Between mains poles (thermal link disconnected for model SA-450ARH)	10	2
Between mains poles (AC current fuse disconnected for model SA-450CDH)	10	2
Between primary circuit and accessible part (earthed)	10	2
Between primary circuit and accessible terminal (non-earthed)	100	4
Input transformer		
Between primary winding and secondary winding	100	4
Between primary winding and iron core	10	2
1 layers insulation tape	100	4
Note: The input transformer iron core was earthed.		

10.3	TABLE: electric strength measurements		P
Test voltage applied between:		Test voltage (V)	Breakdown
Unit:			
Between mains poles (thermal link disconnected for model SA-450ARH)		AC 1500	No
Between mains poles (AC current fuse disconnected for model SA-450CDH)		AC 1500	No
Between primary circuit and accessible part (earthed)		AC 1500	No
Between primary circuit and accessible terminal (non-earthed)		AC 3000	No
Input transformer			
Between primary winding and secondary winding		AC 3000	No
Between primary winding and iron core		AC 1500	No
1 layers insulation tape		AC 3000	No
Note: The input transformer iron core was earthed.			

11.2	TABLE: summary of fault condition tests			P
	Voltage (V) 0,9 or 1,1 times rated voltage:	240X1,1=264V or 220X0,9=198V		—
	Frequency (Hz):	50/60Hz		—
	Ambient temperature (°C) :	35		—
Model SA-450CDH				
No	Component	Fault	dT (K) / Component	Other results (include description and test duration)
1	D101	S-C		Input voltage: 198V, AC fuse (800mA) opened immediately, no hazard, pass.

2	C101	S-C		Input voltage: 198V, DC fuse (6,3A) opened immediately, no hazard, pass.
3	C104	S-C		Input voltage: 198V, DC fuse (6,3A) opened immediately, no hazard, pass.
4	R105	S-C		Input voltage: 198V, DC fuse (6,3A) opened immediately, no hazard, pass.
5	C110	S-C		Input voltage: 198V, DC fuse (6,3A) opened immediately, no hazard, pass.
6	IC101 (pin 3-5)	S-C		Input voltage: 264V, mains current: 0,25A→0, IC101 protected, 10 minutes, no hazards, pass.
7	IC101 (pin 10-11)	S-C		Input voltage: 264V, mains current: 0,25A, 10 minutes, no hazards, pass.
8	IC101 (pin 4-10)	S-C		Input voltage: 264V, mains current: 0,25A, 10 minutes, no hazards, pass.
9	IC101 (pin 4-10)	S-C		Input voltage: 264V, AC fuse (800mA) opened immediately, no hazard, pass.
10	Voltage selector set to 115V	Misuse	Primary winding of transformer dt= 58,4K Secondary winding of transformer dt= 57,5K Iron core of transformer dt= 44,4K Primary lead wire dt= 23,1K PCB under D101 dt= 56,5K PCB under IC101 dt= 66,8K Enclosure (top, near heat sink) dt= 26,3K Enclosure (bottom, near transformer) dt= 23,7K	Input voltage: 264V, mains current: 0,49A, time: 3hrs, no hazard, pass.
11	Output	S-C	Primary winding of transformer dt= 33,6K Secondary winding of transformer dt= 33,3K Iron core of transformer dt= 28,6K Primary lead wire dt= 15,5K PCB under IC101 dt= 58,4K PCB under Q101 dt= 46,9K Enclosure (top, near heat sink) dt= 24,5K Enclosure (bottom, near transformer) dt= 16,3K	Input voltage: 264V, AC current: 0,21A, time: 2,5hrs, no hazard, pass.

12	Ventilation	Blocked	Primary winding of transformer dt= 54,1K Secondary winding of transformer dt= 68,2K Iron core of transformer dt= 47,1K Primary lead wire dt= 33,0K PCB under D101 dt= 69,3K PCB under IC101 dt= 86,1K Enclosure (top, near heat sink) dt= 39,3K Enclosure (bottom, near transformer) dt= 30,0K	Input voltage: 264V, AC current: 0,25A, time: 3hrs, no hazard, pass.
Model SA-450ARH				
13	D2	S-C		Input voltage: 198V, thermal link in transformer opened immediately, no hazards, pass.
14	C31	S-C		Input voltage: 198V, thermal link in transformer opened immediately, no hazards, pass.
15	U1 (pin 4-6)	S-C		Input voltage: 264V, mains current: 0,1A, 10 minutes, no hazards, pass.
16	U1 (pin 10-12)	S-C		Input voltage: 264V, mains current: 0,06A, 10 minutes, no hazards, pass.
17	U1 (pin 4-7)	S-C		Input voltage: 264V, mains current: 0,07A, 10 minutes, no hazards, pass.
18	Output	S-C		Input voltage: 264V, DC fuse (5A) opened immediately, no hazards, pass.
19	Unit	Max. non-clipped output	Primary winding of transformer dt= 62,2K Secondary winding of transformer dt= 60,0K Iron core of transformer dt= 49,9K Primary lead wire dt= 21,8K PCB under D2 dt= 84,0K PCB under U1 dt= 46,4K Enclosure (bottom, near transformer) dt= 27,7K Enclosure (rear, near heat sink) dt= 39,7K	Input voltage: 264V, mains current: 0,22A, time: 3,5 hrs, no hazards, pass.

20	Ventilation	Blocked	Primary winding of transformer dt= 36,9K Secondary winding of transformer dt= 35,5K Iron core of transformer dt= 33,7K Primary lead wire dt= 17,4K PCB under D2 dt= 48,9K PCB under U1 dt= 41,1K Enclosure (bottom, near transformer) dt= 20,9K Enclosure (rear, near heat sink) dt= 35,5K	Input voltage: 264V, mains current: 0,1A, time: 4hrs, no hazards, pass.
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Note:

According to the user manual, the appliance is intended to be used in moderate climate, so the basic ambient temperature is 35°C, The max. Temperature rise is calculated as follows:

- Winding components:

- Class A → dTmax = (150 –35-10)K =105K(10°C decreased by thermal coupler method)

- Components with T-marking:

PCB with T- marking of 130°C: →dT max=(130-35)K=95K

Wire with T- marking of 105°C: →dT max=(105-35)K=70K

- Touchable surfaces with:

dTmax = 65 K

13	TABLES: clearances and creepage distances						P	
Rated supply voltage:		220-240V	Pollution degree:		2	Material Group:		IIIa or IIIb
2 N force on internal parts applied:						Yes		
30 N force on outside of conductive enclosure applied:						Yes		
Location			Operating Voltage		Clearance (mm)		Creepage (mm)	
			V rms	V peak	Min	Actual	Min	Actual
Circuits conductively connected to the mains (use Tables 8, 9 and 11): see note below.								
Model SA-450ARH								
Primary winding to secondary winding of transformer			250	420	4,0	10,0	5,0	10,0
Primary winding to earthed core			250	420	2,0	5,6	2,5	5,6
Two poles of thermal link			250	420	2,0	3,0	2,5	3,0
Primary circuit to secondary circuit (power switch)			250	420	4,0	4,2	5,0	6,0
Primary circuit and secondary circuit (PCB)			250	420	4,0	6,8	5,0	6,8
Primary circuit to bottom enclosure (earthing)			250	420	2,0	5,2	2,5	5,2

Model SA-450CDH

Primary winding to secondary winding of transformer	250	420	4,0	10,0	5,0	10,0
Primary winding to earthed core	250	420	2,0	6,2	2,5	6,2
Two poles of AC current fuse	250	420	2,0	9,6	2,5	9,6
Primary circuit to secondary circuit (power switch)	250	420	4,0	4,2	5,0	6,0
Primary circuit to metal enclosure (earthing)	250	420	2,0	10,0	2,5	10,0

Notes:

1. During this test forces of 2 N were applied on involved components.
2. Primary and secondary winding wound on separated drawer type bobbin. Core is lamination steel core, EI-41 style. Core is considered as earthing. Thermal link was wrapped inside the primary windings and held in position by tape.
3. Metal enclosure connected to PE.

"Min" = minimum required.

"Actual" = Actual dimensions measured.

14	TABLE: list of critical components and materials					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Power plug	Lian Dung	LT- 312	AC250V, 16A	IEC 60884 VDE 0620-1	VDE 40014931	
(Alternative)	Lian Dung	LT- 322	AC250V, 16A	IEC 60884 VDE 0620-1	VDE 40014921	
(Alternative)	I -Sheng	SP-022	AC250V, 16A	IEC 60884 VDE 0620-1	VDE 40013526	
Power cord	Tong Yuan	H05VV-F or H03VV-F	0,75mm² x3G, T105	IEC/EN 60227	VDE 101980	
(Alternative)	Lian Dung	H05VV-F or H03VV-F	0,75mm² x3G, T105	IEC/EN 60227	VDE 127334	
(Alternative)	Lucky United	H05VV-F or H03VV-F	0,75mm² x3G, T105	IEC/EN 60227	VDE 098629	
(Alternative)	I-Sheng	H05VV-F or H03VV-F	0,75mm² x3G, T105	IEC/EN 60227	VDE 40015762	
(Alternative)	Rhythm	H05VV-F or H03VV-F	0,75mm² x3G, T105	IEC/EN 60227	VDE 94010	
Power switch	Pronic	R13	AC250V, 6A, T85, 10E3, level 3	IEC/EN 61058-1	VDE 40009019	
(Alternative)	Light Country	R19A	AC250V, 6A, 10E3, T85, level 3	IEC/EN 61058-1	VDE 40006923	
(Alternative)	Yuequing guanbao	XCK-017	AC250V, 6A, 10E3, T85, level 3	IEC/EN 61058-1	VDE 40007803	
Material of power switch	E I Dupont	FR7025V0 F(+)	PA66, V-0, 130°C	--	UL E41938	
Voltage selector (only for SA- 450CD, SA- 450CDH)	Pronic	L21	AC250V, 10A, T85, 10E3, level 3, V-0	IEC/EN 61058-1 IEC/EN 61058-2	Nemko P05203711	
AC fuse (only for SA-450CD, SA- 450CDH)	Walter	TSD	AC250V, T800mAL, Ø5x20mm	IEC/EN 60127-1 IEC/EN 60127-2	VDE 40001375	
(Alternative)	Walter	TMD	AC250V, T800mAL, Ø5x20mm	IEC/EN 60127-1 IEC/EN 60127-2	VDE 40001376	
Fuse holder (only for SA-450CD, SA-450CDH)	Marushin	MF-527	AC250V, 10A	IEC/EN 60127-1 IEC/EN 60127-6	VDE 40004693	
DC fuse (used for SA-450CD, SA- 450CDH)	Walter	TSD	AC250, T6,3AL, Ø5x20mm	IEC/EN 60127-1 IEC/EN 60127-2	VDE 40001375	

(Alternative)	Walter	TMD	AC250V, T6,3AL, Ø5x20mm	IEC/EN 60127-1 IEC/EN 60127-2	VDE 40001376
DC fuse (used for other models)	Walter	MGC	AC250V, 5A, Ø6x32mm	--	UL E56092
DC fuse holder (used for other models)	Shin Chin	R3-13	AC250V, 10A	--	UL E72169
Thermal shrinkable tube	Chang Yuan	Changbao 102	600Vac, VW-1, 125°C	--	UL E180908
(Alternative)	Various	Various	600Vac, VW-1, 125°C	--	UL
Internal wire	Herwell Electric Wire Co., Ltd.	1015	VW-1, 300Vac, 105°C, 18AWG	--	UL E157882
(Alternative)	Various	1015	VW-1, 300Vac, 105°C, 18AWG	--	UL approval
PCB	Long Chang	LC-04V	V-0, 130°C	--	UL E94733
(Alternative)	Various	Various	V-0 or better, 130°C	--	UL
Optical pick-up	Sanyo	SP-P101V	Wavelength: 790±30nm Laser diode: Sanyo, DL-3150-101, Rohm, RLD78MYA1 Class I laser product	IEC/EN 60825-1	JQA 384-40149-1
Input transformer (only for SA-450CD, SA-450CDH)	Yan Wo	PT-30W	Primary winding 0V-(115V+115V): Pin1-2, Pin3-4: Ø0,34mmx(470Ts+470Ts) Secondary winding (0-16V): Pin5-6: Ø1,4mmx63Ts Class A	Applicable part of IEC 60065 and according to IEC 60085	Tested with appliance
Parts of input transformer PT-30W					
- Magnet wire	Chuen Yih	UEW-B	130°C	--	UL E154709
- Bobbin	EI Dupont	FR-50	PA66, V-0, 130°C, min. thickness: 0,75mm	--	UL E41938
- Thermal link	Aupo	A4-1A	AC250V, 2A, 130°C	IEC/EN 60691	VDE 40005586
(Alternative)	Joint Force	L33	AC250V, 2A, 130°C	IEC/EN 60691	VDE 40008646
- Insulation tape	Jingjiang Yahua	WF	130°C, VW-1	--	UL E165111

Input transformer (only for SA-450ARH, SA-450ARS, SA-450AR, SA-450M, SA-450MEC, SA-450USB)	Yan Wo	PT-15E-220/230/240V	Primary winding 0V- (220V+230V+240V): Pin 1-2-3-4: Ø0,23mmx2Px (1100Ts+50Ts+50Ts) Secondary winding (0-13,5V): Pin 5-6: Ø0,9mmx2Px63Ts Class A	Applicable part of IEC 60065 and according to IEC 60085	Tested with appliance
Parts of input transformer PT-15E-220/230/240V					
- Magnet wire	Chuen Yih	UEW-B	130°C	--	UL E154709
(Alternative)	Feng Ching	UEW	130°C	--	UL E172395
- Bobbin	El Dupont	FR-50	PA66, V-0, 130°C, min. thickness: 0,75mm	--	UL E41938
- Thermal link	Aupo	A2-1A	AC250V, 2A, 115°C	IEC/EN 60691	VDE 40005586
(Alternative)	Joint Force	L20	AC250V, 2A, 115°C	IEC/EN 60691	VDE 40008646
- Insulation tape	Jingjiang Yahua	WF	130°C, VW-1	---	UL E165111
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 60065 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Audio, video and similar electronic apparatus – Safety requirements			
Differences according to: EN 60065:2002 + A1:2006 + A11:2008 + A2:2010 + A12:2011			
Attachment Form No.....: EU_GD_IEC60065K_II			
Attachment Originator.....: Intertek Semko AB			
Master Attachment.....: Date (2011-08)			
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IEC 60065, GROUP DIFFERENCES (CENELEC common modifications (EN))			
Clause	Requirement + Test	Result - Remark	Verdict
Contents	Add the following annexes: Annex ZA (normative) Other international publications quoted in this standard with the references of the relevant European publications (See the CB Bulletin) Annex ZB (normative) Special national conditions Annex ZC (informative) A-deviations		—
Definition 2.2.Z1 (A11:2008)	Add after the definition 2.2.12 the following new definition: PORTABLE SOUND SYSTEM small battery powered audio equipment: • whose prime purpose is to listen to recorded or broadcasted sound; and • that uses headphones or earphones that can be worn in or on or around the ears; and • that allows the user to walk around NOTE Examples are mini-disc or CD players, MP3 audio players or similar equipment.		—
2.2 (A12:2011)	In EN 60065:2002/A11:2008 Delete the definition 2.2.Z1		—

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
3.1	Add the following indent at the end of the list - Exposure to excessive sound pressures from headphones or earphones NOTE A new method of measurement is described in EN 50332-1, Sound system equipment: Headphones and earphones associated with portable audio equipment – Maximum sound pressure level measurement methodology and limit considerations – Part 1: General method for "one package equipment", and in EN 50332-2, Sound system equipment: Headphones and earphones associated with portable audio equipment – Maximum sound pressure level measurement methodology and limit considerations – Part 2: Guidelines to associate sets with headphones coming from different manufacturers.		—
3.1 (A12:2011)	In EN 60065:2002 Delete the addition of indent regarding sound pressure excessive		—
3.Z1 (A2:2010)	After 3.2 add a new clause 3.Z1: To protect against excessive current, short-circuits and earth faults in MAINS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b) and c): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of 11 shall be included as parts of the equipment; b) for components in series or parallel with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short-circuit and earth fault protection may be provided by protective devices in the building installation; c) it is permitted for equipment supplied via an industrial mains plug or for PERMANENTLY CONNECTED APPARATUS, to rely on dedicated over current and short-circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instructions. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for not via an industrial mains plug or for PERMANENTLY CONNECTED APPARATUS the building installation shall be regarded	Equipment relies on 16A rated fuse or circuit breaker of the wall outlet installation protection of the building installation in regard to L to N short circuit. Over-current protection is provided by the build-in fuse.	P
4.1.1	Replace the text of the note by: NOTE For ROUTINE TEST reference is made to EN 50514.		—
5.4.1 za) (A11:2008)	Modify indent za) as follows: za) For a PORTABLE SOUND SYSTEM, a warning that excessive sound pressure from earphones and headphones can cause hearing loss.	Not such equipment.	N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.1 (A12:2011)	In EN 60065:2002/A1:2006 and EN 60065:2002/A11:2008 Delete the modification in indent za) Add the following clause and annex to the existing standard and amendments	Not such equipment.	N/A
	Zx Protection against excessive sound pressure from personal music players		N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	Zx.1 General This sub-clause specifies requirements for protection against excessive sound pressure from personal music players that are closely coupled to the ear. It also specifies requirements for earphones and headphones intended for use with personal music players. A personal music player is a portable equipment ☐ for personal use, that: ☐ is designed to allow the user to listen to recorded or broadcast sound or video; and ☐ primarily uses headphones or earphones that can be worn in or on or around the ears; and ☐ allows the user to walk around while in use. NOTE 1 Examples are hand-held or body-worn portable CD players, MP3 audio players, mobile phones with MP3 type features, PDA's or similar equipment. A personal music player and earphones or headphones intended to be used with personal music players shall comply with the requirements of this sub-clause. The requirements in this sub-clause are valid for music or video mode only. The requirements do not apply: ☐ while the personal music player is connected to an external amplifier; or ☐ while the headphones or earphones are not used. NOTE 2 An external amplifier is an amplifier which is not part of the personal music player or the listening device, but which is intended to play the music as a standalone music player. The requirements do not apply to: ☐ hearing aid equipment and professional equipment; NOTE 3 Professional equipment is equipment sold through special sales channels. All products sold through normal electronics stores are considered not to be professional equipment. ☐ analogue personal music players (personal music players without any kind of digital processing of the sound signal) that are brought to the market before the end of 2015. NOTE 4 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies. For equipment which is clearly designed or intended for use by young children, the limits of EN 71-1 apply.		

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
Cont.	Zx.2 Equipment requirements No safety provision is required for equipment that complies with the following: ☐ equipment provided as a package (personal music player with its listening device), where the acoustic output LAeq,T is ≤ 85 dBA measured while playing the fixed "programme simulation noise" as described in EN 50332-1; and ☐ a personal music player provided with an analogue electrical output socket for a listening device, where the electrical output is ≤ 27 mV measured as described in EN 50332-2, while playing the fixed "programme simulation noise" as described in EN 50332-1. NOTE 1 Wherever the term acoustic output is used in this clause, the 30 s A-weighted equivalent sound pressure level LAeq,T is meant. See also Zx.5 and Annex Zx. All other equipment shall: a) protect the user from unintentional acoustic outputs exceeding those mentioned above; and b) have a standard acoustic output level not exceeding those mentioned above, and automatically return to an output level not exceeding those mentioned above when the power is switched off; and c) provide a means to actively inform the user of the increased sound pressure when the equipment is operated with an acoustic output exceeding those mentioned above. Any means used shall be acknowledged by the user before activating a mode of operation which allows for an acoustic output exceeding those mentioned above. The acknowledgement does not need to be repeated more than once every 20 h of cumulative listening time; and NOTE 2 Examples of means include visual or audible signals. Action from the user is always required. NOTE 3 The 20 h listening time is the accumulative listening time, independent how often and how long the personal music player has been switched off. d) have a warning as specified in Zx.3; and e) not exceed the following: 1) equipment provided as a package (player with its listening device), the acoustic output shall be ≤ 100 dBA measured while playing the fixed "programme simulation noise" described in EN 50332-1; and 2) a personal music player provided with an analogue electrical output socket for a listening device, the electrical output shall be ≤ 150 mV measured as described in EN 50332-2, while playing the fixed "programme simulation noise" described in EN 50332-1.		

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	For music where the average sound pressure (long term LAeq,T) measured over the duration of the song is lower than the average produced by the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. In this case T becomes the duration of the song. NOTE 4 Classical music typically has an average sound pressure (long term LAeq,T) which is much lower than the average programme simulation noise. Therefore, if the player is capable to analyse the song and compare it with the programme simulation noise, the warning does not need to be given as long as the average sound pressure of the song is below the basic limit of 85 dBA. For example, if the player is set with the programme simulation noise to 85 dBA, but the average music level of the song is only 65 dBA, there is no need to give a warning or ask an acknowledgement as long as the average sound level of the song is not above the basic limit of 85 dBA.		
	Zx.3 Warning The warning shall be placed on the equipment, or on the packaging, or in the instruction manual and shall consist of the following: ☐ ☐ ☐ the symbol of Figure 1 with a minimum height of 5 mm; and ☐ ☐ ☐ the following wording, or similar: "To prevent possible hearing damage, do not listen at high volume levels for long periods."  Figure 1 – Warning label (IEC 60417-6044) Alternatively, the entire warning may be given through the equipment display during use, when the user is asked to acknowledge activation of the higher level.		

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
Cont.	Zx.4 Requirements for listening devices (headphones and earphones)		N/A
	Zx.4.1 Wired listening devices with analogue input With 94 dBA sound pressure output LAeq,T, the input voltage of the fixed "programme simulation noise" described in EN 50332-2 shall be ≥ 75 mV. This requirement is applicable in any mode where the headphones can operate (active or passive), including any available setting (for example built-in volume level control). NOTE The values of 94 dBA – 75 mV correspond with 85dBA – 27 mV and 100 dBA – 150 mV.	Not such equipment.	N/A
	Zx.4.2 Wired listening devices with digital input With any playing device playing the fixed "programme simulation noise" described in EN 50332-1 (and respecting the digital interface standards, where a digital interface standard exists that specifies the equivalent acoustic level), the acoustic output LAeq,T of the listening device shall be ≤ 100 dBA. This requirement is applicable in any mode where the headphones can operate, including any available setting (for example built-in volume level control, additional sound feature like equalization, etc.). NOTE An example of a wired listening device with digital input is a USB headphone.	Not such equipment.	N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
	Zx.4.3 Wireless listening devices In wireless mode: ☐ ☐ with any playing and transmitting device playing the fixed programme simulation noise described in EN 50332-1; and ☐ ☐ respecting the wireless transmission standards, where an air interface standard exists that specifies the equivalent acoustic level; and ☐ ☐ with volume and sound settings in the listening device (for example built-in volume level control, additional sound feature like equalization, etc.) set to the combination of positions that maximize the measured acoustic output for the above-mentioned programme simulation noise, the acoustic output $L_{Aeq,T}$ of the listening device shall be ≤ 100 dBA. NOTE An example of a wireless listening device is a Bluetooth headphone.	Not such equipment.	N/A
	Zx.5 Measurement methods Measurements shall be made in accordance with EN 50332-1 or EN 50332-2 as applicable. Unless stated otherwise, the time interval T shall be 30 s. NOTE Test method for wireless equipment provided without listening device should be defined.		N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
6.1 (A11:2008)	Replace the entire subclause in EN 60065:2002 and EN 60065:2002/A1:2006 by: Ionizing radiation Apparatus including a potential source of ionizing radiation shall be so constructed that personal protection against ionizing radiation is provided under normal operating conditions and under fault conditions. <i>Compliance is checked by measurement under the following conditions:</i> <i>In addition to the normal operating conditions, all controls adjustable from the outside BY HAND, by any object such as a tool or a coin, and those internal adjustments or pre-sets which are not locked in a reliable manner, are adjusted so as to give maximum radiation whilst maintaining an intelligible picture for 1 h, at the end of which the measurement is made.</i> NOTE 1 Soldered joints and paint lockings are examples of adequate locking. <i>The dose-rate is determined by means of a radiation monitor with an effective area of 10 cm², at any point 10 cm from the outer surface of the apparatus.</i> <i>Moreover, the measurement shall be made under fault conditions causing an increase of the high-voltage, provided an intelligible picture is maintained for 1 h, at the end of which the measurement is made.</i> <i>The dose-rate shall not exceed 1µSv/h (0,1 mR/h) taking account of the background level.</i> NOTE 2 These values appear in Directive 96/29/Euratom of 13th May 1996. <i>A picture is considered to be intelligible if the following conditions are met:</i> - a scanning amplitude of at least 70 % of the usable screen width; - a minimum luminance of 50 cd/m² with locked blank raster provided by a test generator; - a horizontal resolution corresponding to at least 1,5 MHz in the centre, with a similar vertical degradation; - not more than one flashover per 5 min.	No ionizing radiation.	N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
Z1 (A11:2008)	Add the following new clause after Clause 20: Z1 Resistance to candle flame ignition A television set shall be so designed that the likelihood of ignition and the spread of fire caused by a candle flame is reduced. NOTE 1 An apparatus with a viewing screen is not regarded to be a television set if it is declared not to be so by the manufacturer. This requirement does not apply to the display screen of rear projection TV's. NOTE 2 This exemption has been allowed because this technology is falling out of use and it is expected that within a few years it will no longer exist. This exemption will not be extended to other technologies. NOTE 3 The frame around the screen is not exempted from the requirements. Wood and WOOD-BASED MATERIAL with a thickness of at least 6 mm is considered to fulfil the V-1 requirement when applying CLC/TS 62441. <i>Compliance is checked according to CLC/TS 62441.</i> NOTE 4 The term vertical, as used in the first dash of clause 5.2 of CLC/TS 62441, does not mean a perfectly vertical position. It should be interpreted as any surface that can be touched by the flame of a candle of 150 mm height and 20mm diameter while the candle is still touching the supporting surface. A typical candle used in the home is assumed to be 20 mm diameter. NOTE 5 It is expected that CLC/TS 62441 will in the future be replaced by a standard, at which time that standard will become applicable, subject to a vote by National Committees at the time.	Not television set.	N/A
General	13.3.1 Delete note 4. 14 Delete note 4 and note 5. 15.1.1 Delete notes 1 and 2. 15.2 Delete note 2. 16.1 Delete note 1. 16.2 Delete the note. 20 Delete note 2. Annex B Replace note 1 by: In the CENELEC countries listed in IEC 62151, special national conditions apply. Annex G Delete the note. Annex J.2 Delete the notes of Table J.1. Annex N Add after the introduction: For ROUTINE TEST reference is made to EN 50333. (Replaced by EN 50514)		—

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
General (A2:2010)	In IEC 60065:2001/A2 Delete all the "country" notes according to the following list: 5.3 Note 5.4.1 Note 20 Note For special national conditions, see Annex ZB.		—
Bibliography	Additional EN standards.		—

ZA	Normative references to international publications with their corresponding European publications	P
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ZB	ANNEX ZB TO EN 60065, SPECIAL NATIONAL CONDITIONS (EN)		P
2.6.1	DK: The following is added: Certain types of CLASS I apparatus, see 15.1.1, may be provided with a plug not establishing earthing continuity when inserted in Danish socket-outlets <i>Justification:</i> Heavy Current Regulations, Section 107.		P
3.Z1 (A2:2010)	Denmark Add to the end of the subclause Due to many existing installations where the socket-outlets can be protected with fuses with higher rating than the rating of the socket-outlets the protection for pluggable equipment type A shall be an integral part of the equipment. <i>Justification:</i> In Denmark an existing 13 A socket outlet can be protected by a 20 A fuse.	Should be evaluated during national approval.	N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
5.3 (A2:2010)	Finland, Norway and Sweden To the end of the subclause the following is added: CLASS I apparatus which is intended for connection to the building installation wiring via a plug or an appliance coupler, or both and in addition is intended for connection to other apparatus or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network TERMINALS and ACCESSIBLE parts, have a marking stating that the apparatus must be connected to an earthed MAINS socket-outlet. The marking text in the applicable countries shall be as follows: In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan" In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag"	Should be evaluated during national approval.	N/A
5.4 (A11:2008)	Finland, Norway and Sweden To the end of 5.4 the following is added: CLASS I apparatus which is intended for connection to the building installation wiring via a plug or an appliance coupler, or both and in addition is intended for connection to other apparatus or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network TERMINALS and ACCESSIBLE parts, have a marking stating that the apparatus must be connected to an MAINS socket-outlet with protective earth. The marking text in the applicable countries shall be as follows: In Finland: "Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan" In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag"	Should be evaluated during national approval.	N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.1 (A11:2008)	Norway and Sweden To the end of 5.4.1 (after the compliance statement) the following is added: The screen of the cable distribution system is normally not earthed at the entrance of the building and there is normally no equipotential bonding system within the building. Therefore the protective earthing of the building installation need to be isolated from the screen of a cable distribution system. It is however accepted to provide the insulation external to the equipment by an adapter or an interconnection cable with galvanic isolator, which may be provided by e.g. a retailer. The user manual shall then have the following or similar information in Norwegian and Swedish language respectively, depending on in what country the equipment is intended to be used in: “Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11)” NOTE In Norway, due to regulation for installations of cable distribution systems, and in Sweden, a galvanic isolator shall provide electrical insulation below 5 MHz. The insulation shall withstand a dielectric strength of 1,5 kV r.m.s., 50 Hz or 60 Hz, for 1 min. Translation to Norwegian (the Swedish text will also be accepted in Norway): “Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkopling av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet.” Translation to Swedish: ”Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.”	No cable distribution system	N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
13.3.1	NO: To the second paragraph the following is added: In Norway, due to the IT power distribution system used, the a.c. MAINS supply voltage is considered to be equal to the line-to-line voltage, and will remain 230 V in case of a single earth fault. <i>Justification:</i> Based on a use in Norway of an IT power distribution system where the neutral is not provided.	Added	P
15.1.1 (A11:2008)	Denmark The text of the Danish SNC in EN 60065:2002 has been modified as follows: To the first paragraph the following is added: In Denmark, supply cords of single-phase appliances having a rated current not exceeding 13 A shall be provided with a plug according to the Heavy Current Regulations Section 107-2-D1. Appliances of CLASS I provided with socket-outlets with earth contact or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with the Heavy Current Regulations, Section 107-2-D1 standard sheet DK 2-1a. To the second paragraph the following is added: Socket outlets intended for providing power to CLASS II apparatus with a rated current of 2,5 A shall be in accordance with the Heavy Current Regulation, Section 107-2-D1 standard sheet DKA 1-4a. Other current ratings socket outlets shall be in compliance with the Heavy Current Regulation, Section 107-2-D1 standard sheet DKA 1-3a or DKA 1-3b. To the third paragraph the following is added: Mains socket-outlets with earthing contact shall be in compliance with the Heavy Current Regulation, Section 107-2-D1 standard sheet DK 1-3a, DK 1-5a or DK 1-7a. <i>Justification:</i> Heavy Current Regulations, Section 107-2-D1	No socket outlet.	N/A
15.1.1	IE: Apparatus which is fitted with a flexible cable or cord shall be provided with a 13 A plug in accordance with Statutory Instrument 525:97, "13 A Plugs and Conversion Adapters for Domestic Use Regulations:1997. <i>Justification:</i> SI 525: 1997	Should be considered during the national approval.	N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
15.1.1	NO: Mains socket-outlets mounted on CLASS II apparatus shall comply with the specifications given in CEE Publ. 7 as far as applicable, with the following amendments: § 8 Dimensions a 2.5 A 250 V two-pole socket-outlets for electronic apparatus shall comply with the enclosed Standard Sheet I. Mains socket-outlets mounted on CLASS II apparatus shall comply with the specifications given in CEE Publ. 7 as far as applicable, with the following amendments: § 8 Dimensions a 2.5 A 250 V two-pole socket-outlets for electronic apparatus shall comply with the enclosed Standard Sheet I. § 24 Mechanical strength a 2.5 A, 250 V socket-outlets for CLASS II electronic apparatus are tested as specified in 12.1.3 of EN 60065. Also the protecting rim shall be tested. § 24 Mechanical strength A 2.5 A 250 V socket-outlets for CLASS II electronic apparatus are tested as specified in 12.1.3 of EN 60065. Also the protecting rim shall be tested <i>Justification:</i> Act of 24 May 1929 relating to supervision of electrical installation (TEA 1929/FEL 1998).	CLASS I apparatus	N/A
15.1.1	UK: Apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug shall be fitted with a "standard plug" in accordance with Statutory Instrument 1768: 1994: The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those Regulations. NOTE "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug. <i>Justification:</i> SI 1768: 1994	Should be evaluated during national approval.	N/A

IEC 60065			
Clause	Requirement + Test	Result - Remark	Verdict
J.2	NO: After Table J.1 the following is added: In Norway, due to the IT power distribution system used, the a.c. MAINS supply voltage is considered to be equal to the line-to-line voltage, and will remain 230 V in case of a single earth fault. <i>Justification:</i> Based on a use in Norway of an IT power distribution system where the neutral is not provided.	Considered.	P

ZC	ANNEX ZC TO EN 60065, A-DEVIATIONS (EN)		P
5.1	IT: Additional markings on the outside of the TV receiver in Italian language		N/A
	IT: User instructions in Italian language including a conformity declaration		N/A
	IT: Certification number on the back cover		N/A
6.1	DE: The following requirement applies: For the operation of any cathode ray tube intended for the display of visual images operating at an acceleration voltage exceeding 40 kV, authorization is required, or application of type approval (Bauartzulassung) and marking. <i>Justification:</i> German ministerial decree against ionizing radiation (Röntgenverordnung), in force since 2002-07-01, implementing the European Directive 96/29/EURATOM. NOTE Contact address: Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-38116 Braunschweig, Tel.: Int+49-531-592-6320, Internet: http://www.ptb.de	No cathode ray tube used.	N/A
14	SE: Switches containing mercury such as thermostats, relays and level controllers are not allowed. <i>Justification:</i> Ordinance (1990:944) on Prohibition in Connection with handling. Importation and exportation of Chemical Products (Certain Cases)	No such switch used.	N/A